22069 VAN BUREN STREET, GRAND TERRACE, CALIFORNIA 92313-5607
TELEPHONE (909) 422-1730 • FAX (909) 783-3440
www.wildenpump.com

CHEMICAL RESISTANCE GUIDE

This information is compiled from numerous sources and believed to be reliable to this date. **It is intended as a guideline to be used with all available information to determine suitability of elastomers and wetted portions of Wilden pumps for various applications.** We suggest thorough research which should include known applications when determining pump construction. This chart is to be used at your discretion and risk. **The accuracy of these ratings cannot be guaranteed.**

SELECTING THE BEST DIAPHRAGM FOR A WILDEN AIR-OPERATED DOUBLE-DIAPHRAGM PUMP

In the absence of previous experience (which is always the best guide) diaphragm material must be selected from available resistance charts. The Wilden Chemical Resistance Guide is compiled from numerous reliable sources and cross-checked, however, it is only intended as an additional source of information.

Diaphragm life not only depends on a diaphragm's chemical compatibility with the process fluid but also on the diaphragm's ability to flex. Diaphragm life will vary depending on the abrasiveness of your process fluid, temperature, size of diaphragm, pumping media, and lift conditions. Consult your authorized Wilden distributor regarding which diaphragm material will work best for your application requirements.

As a general rule:

1. Neoprene or Wil-Flex diaphragms should generally be used unless the chart shows them to be unsatisfactory. Even though Buna-N, NORDEL and Viton® may show "A" ratings, if Neoprene or Wil-Flex™ have at least a "B" rating, it will probably be the most economical choice on a "cost of diaphragms per gallon pumped" basis.
2. This is especially true when considering the use of Viton® diaphragms due to their replacement cost being over six times that of Neoprene. Viton® should only be considered for aggressive media at extreme temperatures if it shows an "A" rating and Neoprene, Buna-N and Nordel show an unsatisfactory rating.

These guides for best diaphragm selection do not hold for the valve ball material. Because the diaphragms are securely gripped by their inner and outer beads, they can stand up to 20% swell without causing any trouble. If the valve balls swell even a very small amount, they cannot function properly. Therefore, there will be cases where Neoprene diaphragms will be the best selection but Teflon®, Buna-N, Nordel or Polyurethane balls will be required.

Caution: Temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guides for chemical compatibility and temperature limits.

It must be emphasized that none of these figures are absolute and are only general guidelines.

SELECTION OF PLASTIC MATERIALS

Many factors can affect the chemical resistance of plastics. These include, but are not limited to, exposure time, extremes of temperature and pressure, frequency of temperature and/or pressure cycling, attrition due to abrasive particles, and the type of mechanical stress imposed. The fact that certain combinations of chemicals and mechanical load can induce stress cracking in many otherwise chemically resistant materials, both metallic and nonmetallic, is of particular significance.

The chemical/temperature ratings presented are based on well-processed or well fabricated test specimens being essentially resistant to either chemical attack and/or severe swelling which would normally impair their performance under moderate mechanical stresses.

Operating parameters are dependent upon the particular application of Polypropylene or PVDF and may differ from those experienced in either laboratory testing or apparently similar field service. Because corrosive fluids or vapors are often mixtures of various individual chemicals, it is strongly recommended that trial installations be evaluated under actual service conditions.

For example, immersion testing in individual chemicals at a specific operating temperature doesn't predict the performance of Polypropylene or PVDF should an exothermic reaction take place when mixtures of chemicals are involved.

The ratings given on the following pages are a guide and do not constitute a warranty of any kind, expressed or implied, with respect to the performance of the materials Wilden Pump & Engineering Co. offers in any specific application.

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Saniflex and Wil-Flex are trademarks of Wilden Pump & Engineering Co.

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CHEMICALS	ELASTOMERS								METALS					PLASTICS				
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ACETALDEHYDE	B	D	D	D	A	D	A	—	B	A	A	A	A/100	B/70	A	C	C	D
ACETAMIDE	A	D	A	A	A	A	A	—	A	A	A	—	A/200	B/120	A	A/70	A/70	A/140
ACETATE SOLV	B	D	D	D	C	—	A	—	B	D	A	—	A/100	A	—	B/72	B/72	A
ACETIC ACID, GLACIAL	B	C	D	D	B	D	A	B	B	D	A	A	A/100	D	D	A/100	D	A/120
ACETIC ACID	B	C	C	C	A	C	A	A	B	D	A	A	A/100	D	D	B/70	A/120	A
ACETIC ANHYDRIDE	A	D	B	D	B	D	A	D	B	D	A	A	A/200	D	D	C	D	B/70
ACETONE	B	D	D	D	A	D	A	B	A	A	A	A	A/200	B/120	A	D	B/70	D
ACETOPHENONE	B	D	D	D	A	D	A	—	B	A	B	—	A/200	A	—	A/70	—	A/70
ACETYL CHLORIDE	B	D	D	D	C	B	A	—	D	A	B	—	A/100	D	—	—	D	A/120
ACETYLENE	C	—	B	A	A	A	A	A	A	A	A	—	A/200	A	A	B/72	D	A
ACRYLONITRILE	B	—	D	D	D	D	A	—	B	A	A	B	—	B/70	—	B	A	A/70
ADIPIC ACID	B	—	D	B	—	—	A	—	B	B	B	—	—	—	—	B	A	B
ALCOHOLS																		
AMYL	A	C	B	B	A	B	A	A	B	B	A	A	A/200	A	A	B	B/120	A
BENZYL	A	—	B	D	C	A	A	—	B	B	A	A	A/200	D	A	A/70	D	A
BUTYL	A	D	A	A	A	A	A	—	B	B	A	A	—	A	A	B	A	A
DIACETONE	C	B	D	D	B	D	A	—	A	A	A	A	—	A	A	B/72	B/72	A/70
ETHYL	B	D	A	A	A	A	A	A	B	A	A	A	—	B	A	A	B	A
HEXYL	B	D	B	A	B	A	A	—	A	A	A	A	—	A	A	A/70	A	A
ISOBUTYL	A	D	A	C	A	A	A	—	B	C	A	A	—	B/70	A	—	A/120	A
ISOPROPYL	B	D	B	C	B	A	A	A	B	C	A	A	A/70	B/70	A	A	A/120	A/150
METHYL	A	D	A	A	B	D	A	A	B	A	A	A	A/70	B/70	A	A/120	A/70	A
OCTYL	B	D	B	B	A	A	A	—	A	A	A	A	—	A	A	—	A	—
PROPYL	A	D	A	A	B	A	A	—	A	A	A	A	A/70	B	A	A	A/120	A/120
ALKAZENE	D	B	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—
ALUM-NH3-CR-K	A	—	A	A	A	D	A	—	—	—	—	—	—	—	—	—	—	A
ALUMINUM ACETATE	A	D	B	C	A	D	A	—	A	D	B	B	—	—	—	—	—	—
ALUMINUM CHLORIDE 20%	A	B	A	A	A	A	A	D	B	D	C	A	—	D	C	A	B/120	A
ALUMINUM FLUORIDE	A	C	A	A	B	—	A	—	B	D	C	B	A	B/70	C	A	A/70	A
ALUMINUM HYDROXIDE	A	—	A	A	A	A	A	—	A	D	A	—	A	B/70	A	A	A/120	A
ALUMINUM NITRATE	A	C	A	A	A	A	A	—	B	D	A	—	A	B/70	B	A	A/120	A
ALUMINUM PHOSPHATE	A	—	A	A	A	A	A	—	—	—	A	—	—	—	—	—	—	—
ALUMINUM POTASSIUM SULFATE (ALUM)	A	—	A	A	A	A	A	—	B	D	A	B	—	D	C	A	A/120	A
ALUMINUM SULFATE	B	D	A	A	A	A	A	D	C	D	A	A	A	A/120	B	A	A/120	A
AMINES	A	D	B	D	—	D	—	—	A	D	A	—	D	D	D	—	C/70	—
AMMONIA, ANHYDROUS	A	D	A	B	A	D	A	—	B	D	A	A	A/200	B/70	D	A/70	B/120	D
AMMONIA, GAS (COLD)	A	—	A	A	D	A	A	—	—	—	—	—	—	—	A	B	—	D
AMMONIA, GAS (HOT)	A	—	B	C	C	D	A	—	—	—	—	—	—	—	A	—	—	—
AMMONIA, LIQUIDS	A	B	A	B	A	D	A	—	D	A	A	B	—	B/70	D	A/70	C/70	A
AMMONIA NITRATE	A	D	C	A	—	—	—	—	C	A	A	—	—	D	C	A	A	A
AMMONIUM BIFLUORIDE	A	—	A	A	—	A	A	—	D	D	A	B	A	—	D	A/70	A/120	A
AMMONIUM CARBONATE	A	—	A	D	A	B	A	—	C	C	A	B	A	A	D	A	B/120	A
AMMONIUM CASENITE	A	—	A	—	—	—	—	—	—	—	A	—	—	—	A	—	—	—
AMMONIUM CHLORIDE	A	A	A	A	A	A	A	A	C	D	C	A	A	C	B	A	A/120	A
AMMONIUM HYDROXIDE	A	D	A	B	A	B	A	D	C	A	A	A	A/200	A	C	A	A/70	A
AMMONIUM NITRATE	A	D	A	A	A	B	A	—	B	A	A	A	A	B	A	A	A/70	A
AMMONIUM NITRITE	A	—	A	A	A	—	A	—	—	—	—	—	—	—	—	A/70	—	A
AMMONIUM OXALATE	A	—	A	A	—	—	—	—	—	D	A	A	—	—	B	—	—	—
AMMONIUM PERSULFATE	A	D	A	D	B	A	A	—	C	D	A	A	A/150	D	D	A	A/120	A
AMMONIUM PHOSPHATE, DIBASIC	A	—	A	A	A	A	A	—	B	D	A	A	A/70	D	B	A	A/120	A
AMMONIUM PHOSPHATE, MONOBASIC	A	—	A	A	A	A	A	—	B	D	A	A	—	B	B	A	A	A
AMMONIUM PHOSPHATE, TRIBASIC	A	—	A	A	A	A	A	—	B	D	A	A	—	B	B	A	C	A
AMMONIUM SULFATE	A	A	A	A	A	D	A	B	B	C	A	B	A	B/70	B	A	A/70	A
AMMONIUM THIO-SULFATE	A	—	A	A	A	—	A	—	—	D	A	—	—	—	B	—	A	—
AMYLACETATE	B	D	D	D	B	D	A	B	B	C	A	B	A/100	C	B	C/70	C/70	A/120

Ratings: A: Minor effect; B: Minor to moderate effect; C: Moderate to severe effect; D: Not recommended; —: Insufficient information.

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AMYL-ALCOHOL	B	D	B	B	A	B	A	A	B	B	A	A	A	B/70	A	B	B/120	A
AMYL-BORATE	B	—	B	A	D	A	A	—	—	—	—	—	—	—	—	—	—	—
AMYL-CHLORIDE	C	—	D	D	D	A	A	—	D	A	A	A	A	D	A	D	D	A
AMYL-CHLORONAPTHALENE	C	D	D	B	D	A	A	—	—	—	—	—	—	—	—	—	—	—
AMYL-NAPTHALENE	C	D	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—
ANILINE	B	—	D	D	—	D	A	D	C	C	A	B	A/100	C	A	B	C	C/70
ANILINE DYES	B	D	B	C	A	A	A	—	B	A	B	—	—	—	—	—	—	—
ANILINE HYDROCHLORIDE	A	D	D	C	B	B	A	—	D	D	D	—	—	D	—	—	D	A
ANIMAL FATS	B	B	B	A	A	A	A	—	A	A	A	—	—	—	A	—	—	—
ANSUL ETHER	D	B	D	C	C	D	A	—	—	—	—	—	—	—	—	—	—	—
ANTI-FREEZE	A	—	C	A	—	A	—	—	A	A	A	—	—	D	D	A	—	—
AQUA REGIA (80%, HCl, 20% HNO3)	D	D	D	D	C	C	A	—	D	D	D	D	A/100	D	D	B	B/70	A/70
AROCHLOR(S)1248	D	—	D	D	C	A	A	—	A	B	A	—	—	B/70	—	—	C/70	—
AROMATIC HYDROCARBONS	C	D	D	D	D	A	A	—	A	A	A	—	—	A	A	D	C	—
ARSENIC ACID	A	C	A	A	A	A	A	—	D	D	A	—	A	C	D	A	B/120	A
ARSENIC TRICHLORIDE	B	—	A	C	D	D	A	—	D	D	D	—	—	—	D	—	—	—
ASKAREL	D	D	C	B	D	A	A	—	—	—	—	—	—	—	—	—	—	—
ASPHALT	B	B	B	B	D	A	A	D	C	A	A	—	—	A	B	A	A/70	A
BARIUM CARBONATE	A	—	—	A	A	A	A	—	B	A	A	—	A	B/70	A	A	B/120	A
BARIUM CHLORIDE	A	A	A	A	A	A	A	—	D	C	C	A	A	B/120	A	A	A/70	A
BARIUM CYANIDE	A	—	A	C	—	A	—	—	C	C	A	—	—	—	B	—	B	—
BARIUM HYDROXIDE	A	A	A	A	A	A	A	D	D	D	A	B	A	B/70	D	A	B/120	A
BARIUM NITRATE	A	—	A	A	—	A	—	—	B	A	A	—	A/73	B/70	B	—	B/120	—
BARIUM SULFATE	A	A	—	A	A	A	A	—	D	B	A	—	A	B/70	B	A	B/120	A
BARIUM SULFIDE	A	A	A	A	A	A	A	—	D	D	A	—	A	B/70	A	A	B/120	A
BEER	A	D	A	A	A	A	A	A	A	D	A	—	A/150	B/70	A	B/70	A/120	A/175
BEET SUGAR LIQUIDS	A	D	B	A	A	A	A	—	A	A	A	—	—	A	B	A	A/70	A
BEET SUGAR LIQUORS	A	D	A	A	A	A	A	—	A	B	A	—	A/150	—	A	—	—	—
BENZALDEHYDE	B	D	D	D	B	D	A	—	B	A	A	—	A/73	C	A	D	A/70	A/70
BENZENE	C	D	D	D	D	A	A	B	B	A	A	B	A/200	A	A	B/72	C/70	A/70
BENZENESULFONIC ACID	A	D	A	C	C	A	A	—	D	D	B	—	A/200	D	C	—	A/70	A/70
BENZYL BENZOATE	C	—	D	D	B	A	A	—	A	B	B	—	—	—	—	—	—	—
BENZYL CHLORIDE	C	D	D	D	D	C	A	—	D	D	B	—	A/100	A	A	D	—	C
BENZOIC ACID	A	D	D	D	B	A	A	—	B	D	A	A	A/250	D	B	B	A/70	A
BENZOL	B	D	D	D	D	D	A	A	B	B	A	A	—	D	A	D	C/70	A/70
BLAST FURNACE GAS	A	D	A	C	B	A	A	—	—	—	—	—	—	—	D	—	—	—
BLEACH SOLUTIONS	B	D	D	D	A	A	A	—	D	—	—	—	A	—	D	B	A/70	—
BORAX (SODIUM BORATE)	A	A	D	B	A	A	A	A	C	A	A	A	A	A	B	A	A/120	A
BORDEAUX MIXTURE	A	D	A	A	A	A	A	—	D	C	A	—	—	—	—	—	—	—
BORIC ACID	A	A	A	A	A	A	A	A	B	D	A	A	A	B	A	A	A/120	A
BRINE	A	A	A	A	A	A	A	—	C	C	—	A	A	—	A	A	—	A
BREWERY SLOP	A	—	A	A	—	A	—	—	—	A	A	—	—	—	—	—	—	—
BROMINE	C	D	D	D	C	A	A	—	D	—	D	A	A/150	D	D	B/72	D	A/150
BROMINE-ANHYDROUS	C	D	D	—	C	A	A	D	D	D	D	—	—	D	—	D	—	A/150
BROMINE-TRIFLUORIDE	C	D	D	D	D	D	A	—	D	D	B	—	—	—	D	D	—	—
BROMINE-WATER	B	D	B	—	—	A	A	—	D	D	B	—	A/250	—	D	D	—	A
BROMOBENZENE	D	D	D	D	D	B	A	—	D	B	B	—	A/73	—	—	D	—	—
BUNKER OIL	B	B	B	A	D	A	A	—	A	A	A	—	—	—	—	—	—	—
BUTADIENE	C	D	B	A	C	A	A	—	A	—	A	—	A/200	—	A	—	D	A
BUTANE	C	A	B	A	C	A	A	A	A	—	A	—	A/200	B/70	A	B/72	C/70	A/200
BUTTER	B	A	B	A	A	A	A	—	A	D	A	—	—	—	A	—	—	—
BUTTERMILK	A	—	A	A	—	A	—	—	A	D	A	—	—	B/70	A	—	A/70	—
BUTYL ACETYL RICINOLEATE	B	D	B	A	D	A	A	—	A	A	A	—	—	—	A	—	—	—
BUTYL ACETATE	B	C	D	D	B	D	A	B	A	A	C	B	A/150	A	A	D	C/70	A/70
BUTYL ACRYLATE	C	—	D	D	D	D	A	—	—	—	—	—	—	—	A	D	—	A/70

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BUTYL AMINE	A	D	D	B	D	D	A	—	A	—	—	B	—	A	C	—	—	B/70
BUTYL BENZOATE	C	—	D	—	B	A	A	—	B	B	B	—	—	—	A	—	—	—
BUTYL CARBITOL	B	—	B	A	A	A	A	—	—	—	—	—	—	—	A	—	—	—
BUTYL CELLOSOLVE	A	D	C	B	A	C	A	—	—	—	—	—	A/73	—	A	—	—	—
BUTYL OLEATE	C	—	D	—	B	A	A	—	—	—	—	—	—	—	A	—	—	—
BUTYL STEARATE	C	—	D	A	B	A	A	—	B	B	B	—	A/73	—	A	—	—	—
BUTYLENE	D	D	—	B	D	A	A	—	A	—	A	—	A	B/70	A	D	B/70	A
BUTRALDEHYDE	C	C	C	D	B	D	A	—	—	—	—	—	—	—	—	D	—	B
BUTYRIC ACID, AQEOUS	A	—	D	D	C	D	A	—	B	—	A	A	A	B/70	C	A	D	A
CALCIUM BISULFIDE	D	A	A	A	—	A	—	—	C	—	B	A	A	A	A	A	B/70	A
CALCIUM CARBONATE	A	—	A	A	A	A	A	—	C	—	A	A	A	A	A	A	B/70	A
CALCIUM CHLORIDE	A	A	A	A	A	A	A	A	C	C	C	A	A	B/70	D	A	B/70	A
CALCIUM HYDROXIDE	A	A	A	A	A	A	A	B	C	A	A	A	A	A/120	D	A	A/120	A
CALCIUM HYPOCHLORITE	A	D	B	B	B	A	A	B	C	D	A	A	A	C	D	A	A/70	A
CALCIUM NITRATE	A	A	A	A	A	A	A	—	B	C	B	B	A	D	D	A	A/70	A
CALCIUM SULFATE	A	—	D	A	A	A	A	—	B	A	A	B	A	D	D	A	B/70	A
CALCIUM SULFIDE	A	A	B	A	A	A	A	—	A	B	B	—	—	—	—	A/120	—	A
CALGON	A	—	A	A	—	A	—	—	—	D	A	—	—	A	A	A	—	—
CANE JUICE	A	D	A	A		—	—	—	B	A	A	—	—	A	A	B/72	—	A
CANE SUGAR LIQUORS	A	D	A	A	A	A	A	—	A	B	A	—	A/150	—	—	A	—	—
CARBAMATE	A	D	B	C	B	A	A	—	—	—	—	—	—	—	—	—	—	—
CARBITOL	B	D	B	B	B	A	A	—	B	B	B	—	—	—	—	C	—	A
CARBOLIC ACID (SEE PHENOL)	A	C	C	D	C	A	A	D	B	D	A	A	A/150	C	D	C	D	A/70
CARBON BISULFIDE	D	C	D	D	D	A	A	B	A	—	A	—	—	A	A	B/72	—	A
CARBON DIOXIDE	A	A	B	A	A	B	A	A	A	D	A	A	A	B/70	A	A	A/70	A
CARBON DISULFIDE	D	C	D	D	D	A	A	—	C	A	A	B	A/200	B/70	A	B/72	C/70	A/70
CARBON MONOXIDE	A	A	B	A	C	A	A	A	A	A	A	B	A/150	A	A	A	A/120	B
CARBON TETRACHLORIDE	D	C	D	C	D	A	A	D	D	C	A	A	A/200	D	A	B/72	D	A
CARBONATE WATER	A	—	A	A	—	A	—	—	A	D	A	—	—	A	A	A	A	A
CARBONIC ACID	A	A	A	B	A	A	A	—	A	D	B	A	A	B/70	B	A	B/120	A
CATSUP	A	—	C	A	—	A	—	A	D	D	A	—	—	A	B	A	—	—
CELLOSOLVE	C	D	C	C	A	B	A	—	B	B	B	—	A/200	A	A	A	—	A
CELLOSOLVE ACETATE	C	D	D	C	A	A	A	—	—	—	—	—	A/73	—	A	—	—	A/120
CELLULUBE	D	D	D	D	A	A	A	—	—	—	—	—	—	—	A	—	—	—
CLORACETIC ACID	D	D	D	D	B	D	A	—	D	D	C	A	A	D	D	B/72	—	A
CHLORINATE GLUE	C	—	D	C	—	A	—	—	D	D	A	—	—	—	D	—	—	—
CHLORINE (DRY)	C	D	D	D	C	A	A	D	D	D	—	A	A/150	D	D	D	D	A
CHLORINE (WET)	C	D	D	D	D	A	A	D	D	B	D	A	A/200	C	D	D	B/70	A
CHLORINE, ANHYDROUS LIQUID	D	—	D	D	—	A	A	D	D	D	D	A	—	C	D	D	D	A
CHLORINE DIOXIDE	D	—	D	D	C	A	A	D	D	D	D	A	A/200	—	—	—	—	A
CHLORINE TRIFLUORIDE	D	D	D	D	D	C	A	D	D	D	A	—	—	—	—	—	—	—
CHLOROACETONE	C	D	C	D	D	B	A	D	D	B	B	—	—	—	B	D	D	—
CHLOROBENZENE (MONO)	C	D	D	D	D	A	A	D	D	B	A	A	A/100	B/70	B	D	D	A/150
CHLOROBROMOMETHANE	D	D	D	D	B	A	A	D	D	B	B	—	—	—	B	D	A	—
CHLOROBUTADIENE	C	D	D	D	D	A	A	D	D	B	A	—	—	—	—	D	—	—
CHLORODODECANE	D	D	D	D	D	A	A	D	D	—	—	—	—	—	—	D	—	—
CHLOROFORM	D	C	D	D	D	A	A	D	D	D	A	B	A/200	D	A	D	C/70	A
1-CHLORONAPTHALENE	D	—	D	D	D	A	A	D	D	B	B	—	—	—	—	D	—	—
1-CHLORO 1-NITRO ETHANE	C	D	D	D	D	C	A	D	D	—	—	—	—	—	—	D	—	—
CHLOROSULFONIC ACID	A	D	D	D	D	D	A	D	D	D	D	B	—	D	D	D	D	D
CHLOROTOLUENE	C	D	D	D	D	A	A	D	D	B	B	—	—	—	A	D	—	—
CLOROX® (BLEACH)	B	D	B	C	—	A	A	D	D	D	A	A	—	A	D	B	—	—
CHOCOLATE SYRUP	A	—	—	A	—	A	—	—	A	D	A	—	—	A	A	A	—	—
CHROMIC ACID 5%	A	D	D	D	A	A	A	—	C	D	A	A	A/200	D	D	A/70	D	A/120
CHROMIC ACID 50%	A	D	D	D	C	A	A	—	C	D	B	A	A/200	C	D	A/70	D	A/120

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WILDEN A DOVER COMPANY 22069 Van Buren Street Grand Terrace, California 92313-5607 Telephone (909) 422-1730 • FAX (909) 783-3440 www.wildenpump.com	WIL-FLEX™	POLYURETHANE	NEOPRENE	BUNA-N	NORDEL	VITON®	TEFLON®	SANIFLEX™ TPE	ALUMINUM	CAST IRON	STAINLESS STEEL (316)	HASTELLOY®	HALAR® ECTFE COATED	NYLON	CARBON-FILLED ACETAL (CFA)	POLYPROPYLENE	POLYETHYLENE	PVDF
CHROME PLATING SOLUTIONS	B	D	D	D	D	A	A	D	D	D	D	A	—	—	D	B	—	A
CIDER	A	—	A	A	—	A	—	D	B	D	A	—	—	—	A	—	B	—
CITRIC ACID	A	A	A	A	A	A	A	A	C	D	A	A	A	B/70	C	A	D	A
CITRIC OILS	C	—	D	A	B	A	A	—	C	D	A	—	—	—	B	A	—	—
COBALT CHLORIDE (2N)	A	D	A	A	C	A	A	—	D	D	—	—	—	—	—	A	—	—
COFFEE	A	D	A	A	—	A	—	—	A	—	A	A	—	A	A	A	—	—
COKE OVEN GAS	B	D	C	C	D	A	A	—	—	—	—	—	A	—	—	—	—	—
COPPER ACETATE	A	D	B	B	A	—	A	A	D	D	C	—	—	—	A	—	—	—
COPPER CHLORIDE	A	A	B	A	A	A	A	A	D	D	D	—	A	A	A	A	—	A
COPPER CYANIDE	A	A	A	A	A	A	A	A	D	D	A	A	A	B/70	A	A	B/120	A
COPPER FLUOBORATE	A	—	A	B	—	A	—	A	D	D	D	B	—	—	B	—	—	—
COPPER NITRATE	A	—	A	A	A	A	A	A	D	D	A	A	A	D	A	A	B/120	A
COPPER SULFATE (5% SOLUTION)	A	A	A	A	A	A	A	A	D	D	A	A	A	C	D	A	A/120	A
CREAM	A	—	C	A	—	A	—	—	A	D	A	—	—	A	A	A	—	—
CRESOLS	C	D	D	D	D	A	A	—	B	C	A	B	A/150	D	B	D	C/70	A/150
CRESYLIC ACID	B	D	D	D	D	A	A	—	C	A	A	B	—	D	D	C	B/70	A/150
CYCLOHEXANE	C	B	D	A	D	A	A	A	A	B	A	B	A	A	A	D	B/70	A
CYCLOHEXANOL	B	—	A	B	C	A	A	—	C	B	B	A	A	B	A	B	—	A/150
CYCLOHEXANONE	C	D	D	D	C	D	A	—	B	B	B	—	A/73	A	A	D	D	B/70
CYANIC ACID	B	—	D	C	—	—	—	—	—	D	A	—	—	—	D	—	—	—
DECALIN (DEKLIN)	C	D	D	D	D	A	A	—	—	—	—	—	—	—	—	B/120	—	A/175
DECANE	C	B	D	B	C	A	A	—	—	—	—	—	—	—	—	A/70	—	—
DENATURED ALCOHOL	B	D	B	A	A	B	A	—	A	A	A	—	—	—	A	A	—	A
DETERGENTS	B	A	B	A	A	A	A	—	A	—	A	—	A/200	A	A	A	D	—
DEVELOPING FLUIDS	A	D	A	A	A	A	A	—	—	—	B	—	—	—	A	—	—	—
DIACETONE	B	B	—	D	A	D	A	—	A	A	A	—	A/100	A	—	D	A	A/70
DIBENZYL ETHER	C	B	D	D	C	C	A	—	B	B	B	—	—	—	—	—	—	—
DIBENZYL SEBECATE	C	D	D	D	B	B	A	—	—	—	—	—	—	—	—	—	—	—
DIBUTYL AMINE	B	—	D	C	D	B	A	—	—	—	—	—	—	—	—	D	—	—
DIBUTYL ETHER	B	B	C	B	C	C	A	—	B	B	B	—	—	—	—	D	—	A/20
DIBUTYL PHTHALATE	B	C	D	D	A	B	A	A	A	A	A	—	—	A	—	C	—	D
DIBUTYL SEBECATE	B	D	D	D	B	B	A	A	—	A	A	—	A/200	—	—	B/72	—	D
O-DICHLOROBENZENE	D	D	D	D	D	A	A	—	D	B	B	—	—	—	—	B/70	—	A/150
DICHLORO-ISOPROPYL ETHER	D	B	D	D	C	C	A	—	D	—	—	—	—	—	—	D	—	—
DICYCLOHEXYLAMINE	B	D	D	D	D	B	A	—	—	—	—	—	—	—	—	—	—	—
DIESEL FUEL	C	B	D	A	D	A	A	—	A	A	A	B	A/200	A	A	B/70	C/70	A
DIETHYL BENZENE	C	D	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—
DIETHYL ETHER	B	A	C	B	D	D	A	—	B	B	B	B	A/200	C	—	—	—	A/70
DIETHYL SEBECATE	B	D	D	D	B	A	A	—	A	A	A	—	—	—	—	A/120	—	A/120
DIETHYLAMINE	B	C	B	B	—	D	—	—	A	B	A	A	A/73	B/70	B	C	D	A/70
DIETHYLENE GLYCOL	A	D	A	A	A	A	A	—	B	A	A	B	A/70	B/70	D	—	B/120	A
DIISOBUTYLENE	C	D	C	B	—	A	A	—	B	B	B	—	—	—	A	—	—	A
DIISOPROPYL BENZENE	C	—	D	D	D	A	A	—	—	—	—	—	—	—	A	—	—	—
DIISOPROPYL KETONE	C	D	D	D	A	D	A	—	—	—	—	—	A/73	—	A	—	—	—
DIMETHYL ANILINE	B	—	D	D	B	C	A	—	A	—	—	B	A/200	A	D	A	—	A/70
DIMETHYL FORMAMIDE	A	—	D	C	—	A	A	—	A	A	A	—	A/100	A	C	A/120	A	D
DIMETHYL PHTHALATE	A	—	D	D	B	C	A	—	—	—	B	—	A/200	C	—	A/70	—	A/70
DINITROTOLUENE	B	D	D	D	D	B	A	—	—	—	—	—	—	—	—	—	—	—
DIOCTYL PHTHALATE	C	C	D	D	B	A	A	A	A	A	A	—	A/200	A	B	—	—	—
DIOCTYL SEBECATE	C	B	D	D	B	B	A	—	—	—	—	—	—	—	B	—	—	—
DIOXANE	C	D	D	D	A	D	A	—	B	A	A	—	A/150	A	B	C/120	—	C/120
DIOXOLANE	C	D	D	D	C	B	A	—	—	—	—	—	—	—	B	—	—	—
DIPENTENE	C	D	D	C	D	A	A	—	A	A	A	—	—	—	—	—	—	—
DIPHENYL	C	D	D	D	D	A	A	—	A	B	B	B	—	—	—	—	—	A/120
DIPHENYL OXIDE	C	D	D	D	D	A	A	—	B	A	A	B	—	—	D	—	—	B

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DOWTHERM OIL	D	B	D	—	D	A	A	—	C	B	A	—	A/200	A	—	—	—	—
DRY CLEANING FLUIDS	D	C	D	C	D	A	A	—	A	A	A	—	—	—	—	D	—	—
DYES	B	—	C	—	—	A	—	—	B	—	A	—	—	A	C	—	—	—
EPICHLOROHYDRINE	B	D	D	D	B	D	A	D	D	A	A	—	A/200	A	B	B/70	—	D
EPSOM SALTS (MAGNESIUM SULFATE)	A	—	A	A	A	A	A	—	A	A	A	B	A	B/70	B	A	A/120	A
ETHANE	C	B	B	A	D	A	A	—	A	—	A	—	—	D	A	—	—	A
ETHANOLAMINE	A	C	B	B	B	D	A	—	B	—	A	B	—	A	D	D	—	C
ETHER	C	C	D	D	D	C	A	—	A	C	A	B	A/200	A	A	C	D	A/70
ETHYL ACETATE	C	D	D	D	B	D	A	B	B	A	A	B	A/150	B/120	A	B/72	A	D
ETHYL ACETOACETATE	C	C	D	D	B	D	A	—	A	A	—	—	A/73	—	A	—	—	A/70
ETHYL ACRYLATE	C	D	D	D	B	D	A	—	A	A	A	—	A/150	—	A	D	—	C
ETHYL BENZENE	C	D	D	D	D	A	A	—	A	B	B	A	—	—	A	D	—	C
ETHYL BENZOATE	C	D	D	D	B	A	A	—	A	A	A	—	—	—	A	—	C/120	D
ETHYL CELLOSOLVE	B	D	C	C	A	B	A	—	—	—	—	—	—	—	A	—	—	—
ETHYL CELLULOSE	A	B	B	B	B	A	A	—	B	A	B	—	—	—	A	—	—	—
ETHYL CHLORIDE	C	C	A	A	C	A	A	D	D	C	A	B	A	B/70	A	D	C/70	A
ETHYL CHLOROCARBONATE	A	D	C	—	—	A	A	D	D	A	—	—	—	—	A	—	—	—
ETHYL CHLOROFORMATE	C	D	C	—	—	A	A	D	D	—	—	—	—	—	A	D	—	—
ETHYL ETHER	C	C	D	B	D	D	A	—	C	B	A	B	A/150	B/70	A	C	D	A
ETHYL FORMATE	B	—	B	D	B	C	A	—	C	A	B	—	A/120	—	A	—	—	—
ETHYL MERCAPTAN	C	—	D	D	D	B	A	—	B	A	B	—	—	—	—	—	—	—
ETHYL OXALATE	B	A	D	D	A	B	A	—	A	—	—	—	—	—	—	—	—	—
ETHYL PENTOCHLOROBENZENE	D	C	D	D	D	A	A	—	D	—	—	—	—	—	—	D	—	—
ETHYL SILICATE	B	—	A	A	A	A	A	—	B	A	A	—	—	—	—	—	—	—
ETHYL SULFATE	B	—	—	A	—	A	A	—	—	—	D	—	—	—	—	—	—	—
ETHYLENE	C	—	—	B	C	A	A	—	A	A	A	—	—	—	A	—	—	—
ETHYLENE CHLORIDE	D	D	D	D	C	A	A	—	D	C	A	B	A	B/70	A	B/72	D	A
ETHYLENE CHLOROHYDRIN	C	D	B	D	A	B	A	—	D	B	B	B	A/73	D	B	D	D	A/70
ETHYLENE DIAMINE	A	D	A	B	A	D	A	—	D	A	A	C	A/73	B/70	A	A	A	D
ETHYLENE DICHLORIDE	D	D	D	D	B	A	A	D	D	A	A	B	A/73	B/70	A	D	D	A
ETHYLENE GLYCOL	A	B	A	A	A	A	A	A	A	B	A	B	A	B/70	D	A/120	A/120	A
ETHYLENE OXIDE	A	C	D	D	D	D	A	A	A	D	—	A	A	A/70	A	D	A	A
ETHYLENE TRICHOLORIDE	D	D	D	D	D	A	A	—	D	A	A	—	—	—	—	D	—	A
FATTY ACIDS	B	—	B	C	D	A	A	—	B	D	A	A	A	B/70	B	B/70	D	A
FERRIC CHLORIDE	A	D	B	A	A	A	A	B	D	D	D	B	A	C	D	A	A/70	A
FERRIC NITRATE	A	A	A	A	A	A	A	—	D	—	A	A	A	C	D	A	A/120	A
FERRIC SULFATE	A	—	A	B	A	A	A	—	D	D	A	A	A	C	D	A	A/120	A
FERROUS CHLORIDE	A	D	A	B	A	A	A	—	D	D	D	B	A	D	D	A	A/120	A
FERROUS SULFATE	A	—	A	B	A	A	A	—	D	D	A	B	A	D	D	A	A/120	A
FISH OIL	B	—	—	A	—	A	A	—	—	—	—	—	—	—	—	—	—	—
FLUOBORIC ACID	A	—	A	B	A	A	A	—	D	D	B	A	A/73	D	A	A	A/120	A
FLUORINE (LIQUID)	D	—	D	D	C	B	A	—	D	D	A	B	—	D	D	D	D	A/70
FLUOROBENZENE	C	—	D	D	D	A	A	—	D	—	—	—	—	—	A	D	—	—
FLUOROCARBON OILS	D	—	—	—	A	—	A	—	D	—	—	—	—	—	—	D	D	—
FLUOROLUBE	D	—	A	C	A	B	A	—	—	—	—	—	—	—	—	—	—	—
FLUORINATE CYCLIC ETHERS	D	—	—	—	—	—	—	—	D	—	—	—	—	—	—	D	—	—
FLUOSILICIC ACID	A	B	A	A	B	—	A	B	D	D	B	—	A	D	A	A	A/120	—
FORMALDEHYDE	B	D	D	C	A	A	A	B	A	D	A	B	A/200	D	A	A	B	A/120
FORMIC ACID	A	D	D	D	B	B	A	B	D	D	A	A	A/250	D	D	A	D	A
FREON 11	D	D	D	C	D	C	A	A	D	C	A	A	A/150	D	A	D	C	A
FREON 12 (WET)	D	A	B	A	B	A	A	A	D	A	A	A	A/150	D	A	B/72	A/70	A
FREON 13	D	—	A	A	A	A	A	A	D	—	—	—	—	—	A	D	—	A
FREON 21	D	—	D	D	D	D	A	A	D	—	—	—	A/150	—	A	D	—	A
FREON 22	D	D	A	D	C	D	A	A	D	D	A	A	A/150	B	A	D	—	A
FREON 31	D	—	A	D	A	D	A	A	D	—	—	—	—	—	A	—	—	—

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FREON 32	D	—	A	A	A	C	A	A	D	—	—	—	—	—	A	—	—	—
FREON 112	D	—	B	B	D	A	A	A	D	—	—	—	—	—	A	—	—	—
FREON 113	D	B	A	A	D	C	A	A	D	—	A	A	A/150	—	A	D	—	A
FREON 114	D	A	A	A	C	A	A	A	D	—	—	—	A/150	—	A	D	—	A
FREON 115	D	—	A	A	A	B	A	A	D	—	—	—	—	—	A	—	—	—
FREON 142B	D	—	A	A	A	D	A	A	D	—	—	—	—	—	A	—	—	—
FREON 152A	D	—	A	A	A	D	A	A	D	—	—	—	—	—	A	—	—	—
FREON 218	D	—	A	A	A	A	A	A	D	—	—	—	—	—	A	—	—	—
FREON C316	D	—	A	A	A	A	A	A	D	—	—	—	—	—	A	—	—	—
FREON C318	D	—	A	A	A	A	A	A	D	—	—	—	—	—	A	—	—	—
FREON 13 B1	D	A	A	A	A	A	A	A	D	—	—	—	—	—	A	—	—	—
FREON 114B2	D	—	A	B	D	B	A	A	D	—	—	—	—	—	A	—	—	—
FREON 502	D	—	A	B	—	B	A	A	D	—	—	—	—	—	A	—	—	—
FREON TF	D	A	A	A	D	B	A	A	D	A	A	A	—	D	A	—	—	B
FREON T-WD602	D	A	B	B	B	A	A	A	D	—	—	—	—	—	—	—	—	—
FREON TMC	D	B	B	B	B	A	A	A	D	—	—	—	—	—	—	—	—	—
FREON T-P35	D	A	A	A	A	A	A	A	D	—	—	—	—	—	—	—	—	—
FREON TA	D	A	A	A	A	C	A	A	D	—	—	—	—	—	—	—	—	—
FREON TC	D	A	A	A	B	A	A	A	D	—	—	—	—	—	—	—	—	—
FREON MF	D	C	C	A	—	—	A	A	D	—	—	—	—	—	—	—	—	—
FREON BF	D	—	B	B	—	—	A	A	D	—	—	—	—	—	—	—	—	—
FRUIT JUICE	A	—	—	A	—	A	A	—	B	D	A	A	A/150	A	D	A	A	A
FUEL OIL	C	B	B	A	D	A	A	—	A	A	A	A	A	B/70	A	C	B	A
FUMARIC ACID	A	—	B	C	—	A	A	—	—	—	—	—	—	—	—	—	—	—
FURAN, FURFURAN	C	—	D	D	D	C	A	—	—	—	—	—	—	—	—	C	—	—
FURAN RESIN	C	—	D	D	D	A	A	—	A	—	A	B	—	—	D	C	D	D
FURFURAL	C	D	D	D	A	D	A	—	A	B	A	B	A/200	B	A	D	D	B/120
GALLIC ACID	B	D	C	D	B	A	A	—	A	D	B	B	A/150	B/70	—	A	A	A/70
GASOLINE — LEADED	C	C	D	A	D	A	A	A	A	A	A	A	A	A	A	D	—	A
GASOLINE — UNLEADED	C	D	D	D	D	A	A	—	A	A	A	A	A	A	A	D	—	C
GELATINE	A	A	A	A	A	A	A	—	A	D	A	A	A/250	B/70	B	A	A/120	A
GLUCOSE	A	A	A	A	A	A	A	—	A	B	A	A	A	B/70	A	A	A/120	A
GLUE P.V.A.	A	A	A	D	B	A	A	A	B	A	A	A	—	A/70	A	B	A/70	A
GLYCERINE	A	A	A	A	A	A	A	A	A	B	A	A	A	A/70	A	A	A/70	A
GLYCOLIC ACID	A	—	A	A	—	A	—	—	—	—	—	A	A/150	—	A	A/70	A/120	A/70
GLYCOLS	A	B	A	A	A	A	A	—	B	B	B	—	A	B/70	D	A	—	A
GOLD MONOCYANIDE	A	—	A	A	—	A	—	—	—	D	A	—	—	—	A	—	—	—
GRAPE JUICE	A	—	A	A	—	A	—	—	B	D	A	—	—	A	B	A	B	A
GREASE	B	—	D	A	D	A	A	—	A	A	A	A	—	—	A	—	—	A
GREEN SULFATE LIQUOR	A	A	A	A	A	A	A	—	—	—	—	—	—	—	—	A	—	—
HALOWAX OIL	D	—	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—
HEPTANE	C	B	B	A	—	A	A	—	A	A	A	A	A	A	A	C/170	B/70	A
HEXANE	C	B	B	A	D	A	A	A	A	A	A	A	A	B/70	A	C/170	D	A
N-HEXALDEHYDE	C	B	A	D	B	C	A	—	A	A	A	—	—	—	—	—	—	—
N-HEXENE-1	C	A	B	A	D	A	A	—	—	—	—	—	—	—	—	—	—	—
HONEY	A	—	A	A	—	A	—	—	A	A	A	A	—	A/70	A	A	B	A
HYDRAULIC OILS (PETROLEUM)	D	A	B	A	C	A	A	—	A	A	A	A	A/100	A/70	A	D	C	—
HYDRAULIC OILS (SYNTHETIC)	D	—	—	C	—	A	—	—	A	A	A	A	A/100	A	A	D	A	—
HYDRAZINE	A	D	B	B	A	A	A	D	—	C	A	—	—	—	B	A/70	—	A/120
HYDROBROMIC ACID	B	D	D	D	A	A	A	—	D	D	D	D	A	D	D	B	B/70	A
HYDROCHLORIC ACID (20%)	A	B	D	C	A	A	A	B	D	D	D	D	A/200	D	D	A	A/120	A
HYDROCHLORIC ACID (37%) (HOT)	C	C	D	D	C	A	A	D	D	D	D	D	—	D	D	—	B/120	A
HYDROCHLORIC ACID (37%) (COLD)	B	C	D	C	B	A	A	D	D	D	D	D	—	D	D	A	B/120	A
HYDROCYANIC ACID	B	C	B	C	B	A	A	C	A	D	A	D	A	—	D	A	A/120	A
HYDROFLUORIC ACID (20%)*	C	—	C	D	—	A	A	D	D	D	D	D	A/250	D	D	A*	A/120	A

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HYDROFLUORIC ACID (50%)*	D	D	C	D	A	A	A	D	D	D	D	D	A/250	D	D	B/72*	A/70	A
HYDROFLUORIC ACID (75%)*	D	—	D	D	C	A	A	D	D	D	D	D	—	D	D	B/72*	C/70	A
HYDROFLUORIC ACID (CONC—) (HOT)	D	D	D	D	—	B	A	D	D	D	D	D	—	D	D	D	D	A
HYDROFLUORIC ACID (CONC—) (COLD)	D	D	B	D	—	A	A	D	D	D	D	D	—	D	D	D	D	A
HYDROFLUOSILICIC ACID (20%)	B	B	B	B	B	A	A	—	D	D	D	B	—	D	—	A	B/120	A
HYDROGEN GAS	A	A	A	A	B	A	A	A	A	A	A	A	A	B/120	—	A	A/120	A
HYDROGEN PEROXIDE	A	C	D	B	C	A	A	—	A	D	A	A	A/150	D	D	A/70	C/120	A/70
HYDROGEN SULFIDE (WET) (COLD)	A	B	B	C	A	A	A	A	D	D	A	A	—	C	D	A	A	A
HYDROGEN SULFIDE (WET) (HOT)	A	—	C	D	A	B	A	A	D	D	A	A	—	D	D	A	A	A
HYDROGEN SULFIDE AQUEOUS SOLUTION	A	—	B	C	A	D	A	—	D	D	A	A	A/150	—	C	A	A	A
HYDROQUINONE	A	—	D	C	—	C	A	—	A	B	B	B	A/250	—	A	A	A	A
HYDROXYACETIC ACID (70%)	A	—	A	A	—	A	A	—	D	B	—	—	—	—	C	—	—	—
HYPOCHLOROUS ACID	A	—	D	D	B	A	A	—	D	D	D	—	A	—	D	A	—	A
INK	A	—	—	A	—	A	—	—	C	D	A	—	—	C	A	—	—	A
IODINE (IN ALCOHOL)	A	D	D	B	D	A	A	—	D	D	D	B	A/150	C	A	A/70	B	A/150
IODINE PENTAFLUORIDE	B	D	D	D	D	D	A	—	—	—	—	—	—	—	—	—	—	—
IODOFORM	B	—	—	D	A	—	A	—	B	A	B	D	—	—	—	—	—	A
ISOOCTANE	C	B	B	A	D	A	A	A	A	—	—	—	A/73	B/70	—	A	B	—
ISOTANE	D	—	—	A	—	A	—	—	A	—	—	—	—	D	—	B/72	—	A
ISOPHORONE	B	B	D	D	C	D	A	—	A	B	A	—	—	—	—	—	—	—
ISOPROPYL ACETATE	B	A	D	D	B	D	A	—	C	—	B	B	—	B/70	A	—	B/70	—
ISOPROPYL CHLORIDE	C	D	D	D	D	B	A	—	D	A	A	—	—	—	A	D	—	—
ISOPROPYL ETHER	C	B	D	B	D	D	A	—	A	—	A	A	A/73	A/70	A	B/72	B	—
JET FUEL (JP3, JP4, JP5)	C	C	D	A	D	A	A	A	A	A	A	A	A	A/70	A	D	D	A
KEROSENE	C	C	B	A	D	A	A	B	A	A	A	B	A	A	A	B/72	C/70	A
KETONES	C	A	D	D	B	D	A	B	B	—	A	A	A/200	A/120	A	D	C/70	A/70
LACQUERS	C	D	D	D	D	D	A	—	A	C	A	A	A/70	A/70	A	C	A	D
LACQUER SOLVENTS	C	D	D	D	D	D	A	B	A	B	A	—	A/70	A/70	A	C	A	D
LACTIC ACID	A	—	C	B	B	A	A	B	C	D	A	B	A/300	C	A	A	A/70	A/70
LARD	B	A	B	A	C	A	A	A	A	A	A	A	A	A/70	A	A	A	A
LATEX — WATER BASE	A	—	B	A	—	A	A	—	A	—	A	—	—	A/70	A	A	—	—
LAVENDER OIL	B	D	C	B	C	B	A	—	—	—	—	—	—	—	—	—	—	—
LEAD ACETATE	A	D	B	B	A	D	A	—	D	A	B	B	A	B/70	B	A	A/120	A
LEAD SULFAMATE	A	—	A	B	A	A	A	—	C	—	—	—	—	B/70	A	A	A/70	A
LIGROIN	B	B	B	A	D	A	A	—	D	—	A	—	—	D	B	B/175	A	A
LIME	A	—	B	A	A	A	A	—	C	A	A	—	—	B/70	B	—	A	A
LIME BLEACH	A	—	B	A	A	A	A	—	D	—	A	—	—	—	—	B	—	—
LIME SULFUR	B	—	A	D	C	A	A	—	—	—	A	—	A/150	B/70	—	A	—	—
LINDOL	A	C	C	D	A	B	A	—	—	—	—	—	—	—	—	—	—	—
LINOLEIC ACID	B	—	D	B	D	A	A	—	A	D	A	—	—	—	—	A/70	A	A
LIQUEFIED PETROLEUM GAS	C	A	B	A	D	A	A	—	—	—	—	A	—	—	A	D	—	—
LUBRICANTS	B	B	B	A	D	A	A	—	A	A	A	—	—	A/70	A	B	D	A
LUBRICATING OILS (PETROLEUM)	D	B	B	A	D	A	A	A	A	A	A	—	A	A/70	A	B	—	A
LYE	A	C	B	C	B	B	A	—	—	—	A	—	—	A/70	—	A	—	A/150
MAGNESIUM CARBONATE	A	—	A	A	C	—	A	—	D	—	A	B	A	—	A	A	B	A
MAGNESIUM CHLORIDE	A	A	A	A	A	A	A	D	D	D	D	A	A	A/70	A	A	A/70	A
MAGNESIUM HYDROXIDE	A	A	B	B	A	A	A	D	D	B	A	A	A	B/70	A	A	A/120	A
MAGNESIUM NITRATE	A	—	A	A	A	—	A	D	D	D	A	A	A	A/70	A	A	A/120	A
MAGNESIUM OXIDE	A	—	A	A	—	—	A	D	B	A	A	—	—	—	A	—	—	—
MAGNESIUM SULFATE	A	—	A	A	A	A	A	D	D	C	A	B	A	A/70	A	B	A/120	A
MALEIC ACID	A	—	D	D	C	A	A	—	B	A	A	B	A/250	B/70	A	A	B/120	A
MALEIC ANHYDRIDE	A	—	D	D	C	A	A	—	A	—	—	A	—	—	A	—	D	A
MALIC ACID	A	—	C	B	D	A	A	—	B	D	A	B	A/250	C/70	A	B	B/120	A
MASH	A	—	A	A	—	—	—	—	A	—	A	—	—	A	A	—	A	—
MAYONNAISE	A	—	—	A	—	A	—	A	D	D	A	A	—	A	A	A	D	A

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MELAMINE	B	—	—	C	—	—	—	—	—	D	D	—	—	A	A	—	—	—
MERCURIC CHLORIDE (DILUTE SOLUTION)	A	—	A	A	A	A	A	B	D	D	D	B	A/250	D	B	A	A	A
MERCURIC CYANIDE	A	—	A	A	A	—	A	—	D	C	A	A	A/250	A	—	A	A	A
MERCURY	A	A	A	A	A	A	A	A	C	A	A	A	A	A/120	A	A	A	A
MESITYL OXIDE	C	D	D	D	B	D	A	—	A	A	A	—	—	—	—	—	—	—
METHANE	C	B	B	A	D	A	A	—	A	—	A	A	A/250	A/120	A	B	—	A
METHANOL (SEE ALCOHOL METHYL)	A	D	A	A	B	C	A	—	B	A	A	A	A/70	B/70	A	A/120	A/70	A
METHYL ACETATE	B	D	B	D	A	D	A	—	A	A	A	A	—	A/120	A	C	B/70	B
METHYL ACRYLATE	B	—	B	D	B	D	A	—	—	A	—	—	—	—	A	—	—	B
METHYL ACETONE	B	—	D	D	—	—	A	—	A	A	A	—	—	A	A	D	—	D
METHYL BROMIDE	D	—	D	B	A	A	A	—	D	A	—	—	A	C	A	D	C/70	A
METHYL BUTYL KETONE	C	D	D	D	B	D	A	—	A	—	A	—	—	D	A	D	—	D
METHYL CELLOSOLVE	B	D	D	D	B	D	A	—	A	C	—	—	A	C	A	B	—	A
METHYL CHLORIDE	D	D	D	D	C	A	A	—	D	D	A	B	A	C	A	D	C/70	A
METHYL CYCLOPENTANE	C	D	C	B	D	A	A	—	—	—	—	—	—	—	A	—	—	—
METHYL DICHLORIDE	D	D	D	D	—	A	—	—	D	—	—	—	—	C	A	D	—	D
METHYL ETHYL KETONE	B	D	D	D	A	D	A	B	A	A	A	A	A/150	A/70	A	C	B/120	D
METHYL FORMATE	B	D	B	D	A	D	A	—	A	B	B	—	—	—	A	—	—	—
METHYL ISOBUTYL KETONE	C	D	D	D	B	D	A	—	B	C	A	A	A/150	A/70	A	B/72	C	D
METHYL ISOPROPYL KETONE	C	—	D	D	C	D	A	—	A	C	A	—	—	D	A	C	D	—
METHYL METHACRYLATE	B	—	D	D	C	D	A	—	—	C	—	—	A/73	—	A	A	—	B
METHYL OLEATE	C	—	D	D	C	B	A	—	—	—	—	—	—	—	A	—	—	—
METHYL SALICYLATE	B	—	D	D	C	B	A	—	A	A	—	—	—	—	A	B	—	B
METHYLACRYLIC ACID	A	—	B	—	B	B	A	—	—	—	—	—	—	—	A	—	—	—
METHYLAMINE	A	—	—	B	A	—	A	—	—	A	A	—	—	—	A	—	A/70	C
METHYLENE CHLORIDE	D	D	D	D	C	B	A	D	D	B	A	A	A/73	—	A	D	D	D
MILK	A	—	A	A	A	A	A	—	A	D	A	A	A/250	A/120	A	A	A	A
MOLASSES	A	D	A	A	A	A	A	—	A	A	A	A	A/150	A/70	A	A	A	A
MONOCHLOROBENZENE	C	D	D	D	D	A	A	—	D	A	A	—	A/100	B/70	A	D	—	A/150
MONOMETHYL ANILINE	B	—	D	D	D	C	A	—	—	—	—	—	—	—	B	C	—	—
MONOETHANOLAMINE	A	C	C	B	B	C	A	—	B	A	A	—	—	A	D	D	C	D
MONOMETHYLETHER	C	—	B	A	A	A	A	—	—	—	—	—	—	—	—	—	—	—
MONOVINYL ACETYLENE	C	—	B	A	A	A	A	—	—	—	—	—	—	—	—	—	—	—
MUSTARD	A	—	C	B	—	A	—	—	B	C	A	A	—	A/70	B	A	A	A
NAPTHA	C	C	D	B	D	A	A	A	A	B	A	B	A	A/70	A	C	A/70	A
NAPTHALENE	C	B	D	D	D	A	A	B	B	B	B	A	A/150	A/70	A	A/70	C	A
NAPTHENIC ACID	B	—	—	B	D	A	A	—	B	B	A	A	—	—	A	—	—	—
NATURAL GAS	C	B	A	A	C	A	A	—	A	A	A	—	A/150	—	A	A	A	—
NEATSFOOT OIL	B	—	—	A	B	A	A	—	A	A	A	—	—	—	B	—	—	—
NEVILLE ACID	A	—	C	C	B	A	A	—	—	—	—	—	—	—	—	—	—	—
NICKEL ACETATE	A	—	B	B	A	A	A	—	D	—	—	—	A/73	—	—	—	—	—
NICKEL CHLORIDE	A	—	A	A	A	A	A	—	D	D	A	—	A	C	A	A	A	A
NICKEL SULFATE	A	A	A	A	A	A	A	—	D	D	A	B	A	A/70	A	A	A	A
NITER CAKE	A	—	A	A	A	A	A	—	—	—	—	—	—	—	—	—	—	—
NITRIC ACID (5-10% SOLUTION)	A	C	D	D	B	A	A	B	D	D	A	A	A	C	C	A/120	B	A/120
NITRIC ACID (20% SOLUTION)	B	C	D	D	B	A	A	D	D	D	A	A	—	D	C	B/70	C	A
NITRIC ACID (50% SOLUTION)	C	C	D	D	D	A	A	D	C	D	A	A	A/150	D	C	B/70	B/70	A
NITRIC ACID (CONCENTRATED SOLUTION)	C	D	D	D	D	A	A	D	A/120	D	A	B	A/150	D	C	D	C/70	A/125
NITRIC ACID — RED FUMING	D	D	D	D	D	B	A	D	A/B	D	A	—	—	D	C	D	—	D
NITROBENZENE	B	—	D	D	C	B	A	D	C	C	B	B	A/150	B/70	B	B/72	C/70	A/70
NITROBENZINE	B	—	D	—	C	A	A	—	—	—	—	—	—	—	B	—	—	A
NITRO ETHANE	A	—	C	D	B	C	A	—	A	A	A	—	—	—	B	C	—	—
NITROMETHANE	A	—	C	D	A	C	A	—	A	A	A	A	A/200	B/70	B	C	A	A/120
NITROGEN (GAS)	A	A	A	A	A	A	A	—	A	A	A	A	A	—	A	A	—	A

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CHEMICALS	ELASTOMERS								METALS					PLASTICS				
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NITROGEN TETROXIDE	D	—	D	D	C	C	A	—	D	D	—	—	—	—	—	D	—	C
OCTADECANE	B	A	B	A	D	A	A	—	—	—	—	—	—	—	—	—	—	—
N-OCTANE	B	—	—	A	D	A	A	—	—	—	—	—	—	—	—	D	—	A
OCTACHLOROTOLUENE	D	D	D	D	D	A	A	—	D	—	—	—	—	—	—	D	—	—
OILS — ANILINE	B	C	D	D	B	A	A	—	C	A	A	B	—	A	D	A	—	A/70
ANISE	C	—	D	—	—	—	A	—	—	A	A	—	—	—	D	—	—	—
BAY	C	—	D	—	—	A	—	—	—	A	A	—	—	—	D	—	—	A
BONE	C	—	D	A	—	A	A	—	—	A	A	—	—	—	D	—	—	A
CASTOR	B	A	A	A	B	A	A	B	A	A	A	—	—	A	A	—	—	A
CINNAMON	C	—	D	—	—	—	—	—	—	—	A	—	—	—	D	—	D	—
CITRIC	C	—	D	A	B	A	A	—	A	D	A	A	A	—	A	A	A	A
CLOVE	C	—	—	A	—	—	—	—	B	—	A	A	—	—	B	B	—	—
COCONUT	B	A	A	A	A	A	A	—	B	A	A	A	—	—	A	A	A	A
COD LIVER	C	A	B	A	A	A	A	—	B	—	A	A	—	—	A	A	—	A
CORN	B	A	D	A	A	A	A	—	B	A	A	A	A	—	A	A	A	A
COTTON SEED	B	A	D	A	A	A	A	A	B	A	A	A	—	A	A	A	A	A
CREOSOTE	B	—	B	A	D	A	A	—	A	—	A	B	—	D	B	D	C	—
DIESEL FUEL (20, 30, 40, 50)	C	—	D	A	—	A	—	A	A	A	A	B	—	A	A	B/70	A	A
FUEL (1, 2, 3, 5A, 5B, 6)	C	—	D	B	D	A	A	—	A	A	A	A	—	A/70	A	B/70	B	A
OILS — GINGER	C	—	A	A	—	A	—	—	—	—	A	—	—	—	A	—	—	A
HYDRAULIC (SEE HYDRAULIC)																		
LEMON	C	—	D	—	—	A	—	—	A	—	A	—	—	—	A	D	—	A
LINSEED	B	B	D	A	B	A	A	D	A	A	A	B	—	A/70	A	A	A	A
MINERAL	C	A	B	A	D	A	A	—	A	A	A	A	—	A	A	B	B/70	A
OLIVE	B	A	B	A	A	A	A	—	A	A	A	A	—	A/70	A	A	A/70	—
ORANGE	C	—	D	A	—	A	—	—	A	—	A	A	—	—	A	A	C/70	A
PALM	B	—	D	A	—	A	A	—	A	A	A	—	—	—	A	—	A	A
PEANUT	B	B	D	A	C	A	A	—	A	A	A	—	—	—	A	B/175	A	A
PEPPERMINT	C	—	D	D	—	A	—	—	D	—	A	—	—	—	A	B/175	—	A
PINE	C	—	D	A	D	A	A	—	A	C	A	—	—	A	A	—	D	A
RAPE SEED	B	B	D	B	A	A	A	—	—	A	A	—	—	—	A	—	D	A
ROSIN	A	—	—	A	—	A	A	—	A	—	A	A	—	A/70	A	A	B/120	A
SESAME SEED	B	—	D	A	—	A	—	—	A	A	A	—	—	—	A	—	—	A
SILICONE	C	A	A	A	A	A	A	—	A	A	A	A	—	A/70	A	A	A	A
SOYBEAN	B	B	D	A	B	A	A	D	A	A	A	A	—	B/70	A	A	A/70	A
SPERM	B	—	D	A	—	A	—	—	—	A	A	—	—	—	A	—	—	A
TANNING	B	—	D	A	—	A	—	—	—	—	A	—	—	—	A	—	—	A
TURBINE	C	—	D	A	D	A	A	—	A	A	A	—	—	—	A	B/70	C	A
OLEIC ACID	B	B	D	B	B	B	A	A	B	C	A	A	A/250	B/120	A	B	C/120	A
OLEUM	D	D	D	C	D	A	A	D	D	D	A	D	A/73	D	D	D	D	D
OLEUM SPIRITS	D	C	D	C	C	A	A	D	D	D	B	—	—	—	—	D	D	D
O-DICHLOROBENZENE	D	D	D	D	A	A	—	D	A	A	—	—	—	—	A	D	—	—
OXALIC ACID (COLD)	A	—	B	B	A	A	A	—	C	D	A	B	A/150	B/120	B	A/70	A/120	A/120
OXGEN — COLD	A	A	A	C	B	A	A	—	A	A	A	—	A	B/70	C	C	—	A
OXYGEN — 200°-400°F	D	D	D	D	D	B	A	—	A	A	A	—	—	D	D	D	—	A
OZONE	A	A	B	D	A	A	A	—	B	—	—	—	A	—	D	D	C/70	A
PAINT THINNER, DUCO	C	D	C	A	D	B	A	—	A	A	A	—	—	—	A	D	—	—
PALMITIC ACID	B	A	B	A	B	A	A	A	C	C	A	B	A/250	C	A	A	—	A
PARAFFIN	A	—	—	A	D	A	A	—	A	—	A	B	A/150	A/70	A	A	B	A
PENTANE	A	D	B	A	D	A	A	—	A	—	C	B	—	A/70	A	—	D	A
PERCHLORIC ACID	C	D	A	D	B	A	A	—	D	D	D	B	A/200	D	C	A	B	A/120
PERCHLOROETHYLENE	A	D	D	C	D	A	A	D	D	B	A	B	A/200	D	A	B/72	D	A
PETROLATUM	B	—	B	A	—	A	—	—	B	—	A	A	—	D	A	A	B	A
PETROLEUM — BELOW 250	B	B	B	A	D	A	A	—	A	A	A	—	A	A	A	A/70	C/70	A/200
PETROLEUM — ABOVE 250	C	D	D	C	D	B	A	—	A	A	A	—	—	D	A	—	C/70	—

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REPLACES E4 9/01

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PHENOL (CARBOLIC ACID)	A	C	D	D	C	A	A	D	B	D	A	A	A/150	C	A	C	D	A/70
PHENYLBENZENE	C	D	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—
PHENYL ETHYL ETHER	C	D	D	D	D	C	A	—	—	—	—	—	—	—	—	—	—	—
PHENYL HYDRAZINE	B	D	D	D	C	A	A	—	—	—	—	—	A/73	—	—	—	—	D
PHORONE	B	D	D	D	C	A	A	—	—	—	—	—	—	—	—	—	—	—
PHOSPHORIC ACID — 20%	A	B	B	C	A	A	A	—	D	D	B	A	—	D	D	A/120	—	A
PHOSPHORIC ACID (TO 40% SOLUTION)	A	B	D	D	B	A	A	—	D	D	A	A	—	D	D	A/120	B/70	A
PHOSPHORIC ACID — 45%	B	B	B	D	B	A	A	—	D	D	B	—	—	D	D	A/120	—	A
PHOSPHORIC ACID (40%-100% SOLUTION)	C	C	D	D	B	A	A	—	D	D	B	A	A/250	C	D	A/120	—	A
PHOSPHORIC ACID CRUDE	C	A	D	D	C	A	A	—	D	D	C	A	—	C	D	A/120	B/70	A
PHOSPHOROUS TRICHLORIDE ACID	B	—	D	D	A	A	A	—	D	B	A	A	A/250	—	D	D	B	A
PHOTOGRAPHIC (DEVELOPER)	A	—	A	A	—	A	—	—	C	D	A	A	A/150	—	A	A	A	—
PICKLING SOLUTION	A	C	C	—	C	B	A	D	—	—	—	A	—	—	D	—	—	—
PICRIC ACID	B	B	B	B	B	A	A	—	C	D	D	D	A/73	C	D	B/70	A	A/70
PINENE	C	B	D	B	D	A	A	—	—	—	—	—	—	—	—	—	—	—
PIPERIDINE	B	D	D	D	D	C	A	—	—	—	—	—	—	—	—	—	—	—
PLATING SOLUTIONS:																		
ANTIMONY	A	—	A	A	—	A	A	—	D	A	A	A	—	D	A/130	A	—	A/70
ARSENIC	A	—	A	A	—	A	A	—	C	A	A	A	—	A	A/110	A	—	—
BRASS	A	—	—	A	—	A	A	—	C	A	A	A	A/150	A	A/100	A	B	A
BRONZE	A	—	A	A	—	A	—	—	C	A	A	A	—	A	B	A	—	—
CADMIUM	A	—	A	A	—	A	A	—	C	—	—	D	A/150	A	C	A	—	A
CHROME	A	—	D	D	A	A	A	—	C	—	A	D	A/150	D	—	A	—	A
COPPER	A	—	—	A	—	A	A	—	C	—	—	D	A/150	A	—	A	—	A
GOLD	A	—	A	A	—	A	A	—	C	—	A	—	A/150	A/70	—	A	—	A
INDIUM	A	—	—	A	—	A	—	—	C	—	A	A	—	D	—	A	—	—
IRON	A	—	A	A	—	A	A	—	C	—	A	A	—	D	—	A	—	A
LEAD	A	—	A	A	—	A	A	—	C	—	—	—	A/150	D	—	A	—	A
NICKEL	A	—	—	A	—	A	A	—	C	—	—	—	A/150	A	—	A	—	A
SILVER	A	—	A	A	—	A	A	—	C	—	A	—	A/150	A/120	—	A	—	A
TIN	A	—	A	A	—	A	A	—	C	—	A	—	A/150	D	—	A	—	A
ZINC	A	—	A	A	—	A	A	—	C	—	A	—	A/150	D	—	A	—	A
POLYVINYL ACETATE EMULSION	A	—	B	—	A	—	A	—	—	B	—	—	—	—	A	B/70	—	A
POTASH	A	B	B	A	B	A	A	—	C	B	A	B	A	A	A	A	A/70	A
POTASSIUM ACETATE	A	D	B	B	A	B	A	—	D	A	B	—	A/70	—	A	A	—	A
POTASSIUM BICARBONATE	A	—	A	A	—	A	A	—	C	A	B	B	—	A/70	A	A	A	A
POTASSIUM BROMIDE	A	—	A	A	A	A	A	—	C	D	A	A	A	A/70	A	A	A	A
POTASSIUM CARBONATE	A	—	B	A	A	A	A	—	C	B	A	B	A	A/70	A	A	—	A
POTASSIUM CHLORATE	A	—	A	A	A	A	A	—	B	C	A	B	—	C	A	A	A/70	A
POTASSIUM CHLORIDE	A	A	A	A	A	A	A	—	B	B	C	B	A	B/70	A	A	A/70	A
POTASSIUM CHROMATE	A	—	A	A	—	A	A	—	A	A	B	A	A	A	D	A	A	A
POTASSIUM CUPRO CYANIDE	A	A	A	A	A	A	A	—	—	—	—	—	—	—	C	—	—	—
POTASSIUM CYANIDE SOLUTIONS	A	A	A	A	A	A	A	—	D	B	A	B	A	A/70	C	A	—	A
POTASSIUM DICHROMATE	A	A	A	A	A	A	A	D	A	B	A	B	A	D	D	A	A	A
POTASSIUM HYDROXIDE	A	B	B	B	B	D	A	D	D	C	A	B	A/150	C	A	A	A	A/150
POTASSIUM NITRATE	A	A	A	A	A	A	A	—	B	A	A	B	A	B/70	B	A	A	A
POTASSIUM PERMANGANATE	A	—	A	A	A	A	A	—	B	B	B	A	—	D	C	B	A	A
POTASSIUM SULFATE	A	A	A	A	A	A	A	—	A	B	B	B	A	A/70	B	A	A/120	A
PRODUCER GAS	C	A	B	A	C	A	A	—	—	—	—	—	—	—	A	—	—	—
PROPANE (LIQUIFIED)	C	B	B	A	D	A	A	—	A	A	A	A	A	A/70	A	B/72	C/70	B/200
PROPYL ACETATE	B	D	D	D	C	D	A	—	—	—	—	—	A/120	—	A	C	—	A/70
PROPYL NITRATE	B	—	—	—	B	C	A	—	A	D	—	—	—	—	A	—	—	—
PROPYLENE	B	D	D	D	D	A	A	—	A	A	A	—	—	—	A	—	—	—
PROPYLENE GLYCOL	A	—	C	A	A	A	A	—	A	B	A	B	—	—	D	A	B/70	A
PROPYLENE OXIDE	A	D	D	—	B	—	A	—	B	B	A	—	D	—	A	C	—	D

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PYRANOL	D	B	D	A	D	A	A	—	—	—	—	—	—	—	—	—	—	—
PYDRAULS	D	D	D	D	B	A	A	A	—	—	—	—	A/70	A/70	—	—	—	—
PYRIDINE	C	—	D	D	B	D	A	D	B	A	B	A	D	C	B	C	B/70	D
PYROGALLIC ACID	A	—	—	—	—	A	—	—	—	D	A	B	A/150	—	D	—	—	A
PYROLIGNEOUS ACID	B	—	C	C	B	A	A	—	D	C	B	—	A/100	—	—	—	—	—
PYRROLE	C	B	D	D	C	C	A	—	—	—	—	—	—	—	—	—	—	—
RADIATION	A	A	B	B	C	B	A	—	—	—	—	—	—	—	D	—	—	—
RED OIL	B	B	C	A	B	A	A	—	—	—	—	—	—	—	—	—	—	—
ROSINS	A	—	—	A	—	—	A	—	A	D	A	—	—	A/70	B	A	B/70	—
RUM	A	D	—	A	A	A	A	—	—	—	A	—	—	A	A	A	—	—
RUST INHIBITORS	B	—	C	A	—	A	—	—	—	C	A	—	—	—	A	A	—	—
SALAD DRESSING	A	—	—	A	—	A	—	—	B	D	A	—	—	A	A	A	—	—
SAL AMMONIAC	A	A	A	A	A	A	A	—	D	D	A	—	—	—	—	—	—	—
SALT WATER	A	A	B	B	A	A	A	A	D	D	C	—	—	A/120	A	A	A	A
SEA WATER	A	A	B	A	A	A	A	A	D	D	C	—	A/250	A/120	A	A	A/120	A
SEWAGE	A	D	A	A	B	A	A	—	B	B	A	—	—	—	A	A	—	A
SHELLAC (BLEACHED)	B	—	—	A	—	—	—	—	A	A	A	—	—	A/70	A	A	A/70	—
SHELLAC (ORANGE)	B	—	—	A	—	—	—	—	A	A	A	—	—	A/70	A	A	A/70	—
SILICATE ESTERS	B	A	B	A	D	A	A	—	—	—	—	—	—	—	—	—	—	—
SILICONE	B	—	A	A	—	A	—	—	B	A	A	—	—	A/70	A	A	—	A
SILICONE GREASES	B	A	A	A	A	A	A	A	—	—	—	—	—	—	A	—	—	—
SILVER BROMIDE	A	—	—	—	—	—	—	—	D	D	B	A	—	—	A	—	A	—
SILVER NITRATE	A	A	A	C	A	A	A	—	D	D	A	A	A	A/70	A	A	A	A
SKYDROL 500	B	D	D	D	A	C	A	A	—	—	—	—	A/70	C	A	—	—	—
SKYDROL 7000	B	D	D	D	C	B	A	—	—	—	—	—	A/70	C	A	—	—	—
SOAP SOLUTIONS	A	A	B	A	A	A	A	A	C	B	A	A	A/150	A/70	A	A	D	A
SODA ASH (SEE SODIUM CARBONATE)																		
SODIUM ACETATE	A	D	B	B	A	D	A	—	B	B	A	A	A	B/70	A	A	A	A
SODIUM ALUMINATE	A	—	A	A	—	A	A	—	C	A	A	B	A	A/70	A	A	—	A
SODIUM BICARBONATE	A	—	A	A	A	A	A	—	A	C	A	B	A	A	A	A	A/120	A
SODIUM BISULFATE	A	—	A	A	A	A	A	—	D	D	A	B	A	A/70	A	A	A/120	A
SODIUM BISULFITE	A	—	A	A	A	A	A	—	A	D	A	A	A	C	A	A	A/120	A
SODIUM BORATE	A	—	A	A	A	A	A	—	C	B	B	A	A	A/70	A	A/140	A/120	A
SODIUM CARBONATE	A	—	A	A	A	A	A	—	C	B	A	A	A	B/70	A	A	B/120	A
SODIUM CHLORATE	A	—	A	A	A	A	A	A	B	—	A	A	A	D	A	A	B/120	A
SODIUM CHLORIDE	A	A	A	A	A	A	A	A	C	B	C	A	—	A/70	A	A	A/120	A
SODIUM CHROMATE	A	—	A	A	—	A	A	D	D	B	—	A	A	D	D	A	—	A
SODIUM CYANIDE	A	—	A	A	A	A	A	—	D	B	A	A	—	A/70	B	A	A/120	A
SODIUM HYDROXIDE (20%)	A	B	B	A	A	A	A	B	D	B	A	B	—	A	A	A	D	A
SODIUM HYDROXIDE (50% SOLUTION)	A	B	C	D	A	A	A	B	D	C	B	A	A/250	A	A	A	D	C
SODIUM HYDROXIDE (80% SOLUTION)	A	B	C	D	A	B	A	—	D	C	D	B	—	C	A	A	D	C
SODIUM HYPOCHLORITE (TO 20%)	A	D	D	C	C	A	A	D	D	D	C	A	A	D	D	B/72	A	A
SODIUM METAPHOSPHATE	A	—	B	A	A	A	A	—	A	C	A	—	A	A/70	B	D	A/70	—
SODIUM METASILICATE	A	—	A	A	—	A	—	—	B	A	A	A	—	—	D	—	—	—
SODIUM NITRATE	A	—	B	C	A	A	A	—	A	A	A	B	A	A/70	A	A	A/120	A
SODIUM PERBORATE	A	—	B	B	A	A	A	—	B	C	C	B	—	B/70	B	A	A/70	A
SODIUM PEROXIDE	B	D	B	C	B	A	A	—	D	D	A	B	A	A/70	C	B/120	A	A
SODIUM PHOSPHATE	A	A	B	B	A	A	A	—	D	B	B	—	A	A/70	—	A	—	A
SODIUM POLYPHOSPHATE (MONO, DI, TRIBASIC)	A	A	D	A	—	A	—	—	D	D	A	A	—	A/70	B	A	A	A
SODIUM SILICATE	A	—	A	A	A	A	A	—	C	B	A	B	A	A/70	C	A	A/120	A
SODIUM SULPHATE	A	A	A	A	A	A	A	—	B	A	A	B	A	A	B	A	A/120	A
SODIUM SULFIDE	A	A	A	A	A	A	A	—	D	A	A	B	A	A/70	B	A	A/120	A
SODIUM TETRABORATE	A	—	—	A	A	A	A	—	C	—	A	—	A	A	B	—	A/120	—
SODIUM THIOSULPHATE (“HYPO”)	A	A	A	B	A	A	A	—	B	C	A	A	A	B	C	A	A/70	A

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E4 1/03
REPLACES E4 9/01

CHEMICALS	ELASTOMERS								METALS				PLASTICS					
WILDEN A DOVER COMPANY 22069 Van Buren Street Grand Terrace, California 92313-5607 Telephone (909) 422-1730 • FAX (909) 783-3440 www.wildenpump.com	WIL-FLEX™	POLYURETHANE	NEOPRENE	BUNA-N	NORDEL	VITON®	TEFLON®	SANIFLEX™ TPE	ALUMINUM	CAST IRON	STAINLESS STEEL (316)	HASTELLOY®	HALAR® ECTFE COATED	NYLON	CARBON-FILLED ACETAL (CFA)	POLYPROPYLENE	POLYETHYLENE	PVDF
SORGHUM	A	—	A	A	—	A	—	—	—	A	A	—	—	A	A	—	—	—
SOY SAUCE	A	B	A	A	B	A	A	—	A	D	A	—	—	A	A	—	—	—
STANNIC CHLORIDE	A	B	D	A	B	A	A	C	D	D	D	—	A	B	B	A	A/120	A
STANNIC FLUOBORATE	A	—	A	A	—	A	—	—	D	D	—	—	—	—	C	—	—	—
STARCH	A	A	A	A	A	A	A	—	A	C	A	—	A/150	A/70	A	—	B	—
STEAM TO 200°F	A	C	C	C	A	D	D	B	A	A	A	—	A	D	B	—	—	—
STEAM 220°F-300°F	B	D	D	D	A	D	D	C	A	A	A	—	A	D	D	—	—	—
STEARIC ACID	B	A	B	C	B	A	A	C	B	—	A	A	A/150	A/120	A	B/72	B/72	A
STODDARD SOLVENT	C	A	B	B	D	A	A	—	A	A	A	A	A	A	A	B/120	C/120	A
STYRENE	C	C	D	D	D	B	A	D	A	A	A	D	—	A/70	A	D	—	B
SUCROSE SOLUTION	A	D	A	A	A	A	A	—	—	B	—	A	—	A	A	—	—	—
SUGAR (LIQUIDS)	A	—	B	A	—	A	—	—	A	—	A	A	—	A/70	A	A	—	—
SULFATE LIQUORS	A	—	C	—	—	—	—	—	B	C	C	A	A/73	B/70	D	A	A/120	A
SULFITE LIQUORS	A	—	A	A	B	A	A	—	D	D	B	—	A/73	—	—	—	—	—
SULFUR	A	B	B	B	A	A	A	C	D	B	A	—	A/250	A/70	—	A	—	A
SULFUR CHLORIDE	D	—	D	D	D	A	A	C	D	D	D	A	A/73	A	D	C	C/70	A/70
SULFUR DIOXIDE	A	—	B	D	A	D	A	D	D	D	A	B	A/150	C	D	A/70	B/70	A
SULFUR HEXAFLUORIDE	B	—	B	B	A	A	A	—	D	D	—	—	—	—	D	—	B	—
SULFUR TRIOXIDE	C	B	C	C	C	A	A	—	D	D	B	—	—	—	—	—	—	—
SULFUR TRIOXIDE (DRY)	C	B	D	D	C	A	A	—	A	A	C	B	—	A/70	D	D	C/70	D
SULFURIC ACID (DILUTE)	A	C	C	D	—	A	A	A	D	D	B	—	—	C	D	A	A/70	A
SULFURIC ACID (TO 10%)	A	D	D	D	A	A	A	A	D	D	C	A	A/250	C	D	A/120	A/70	A
SULFURIC ACID (10%-75%)	A	D	D	D	C	A	A	B	D	D	C	B	A/150	D	D	A/72	B/70	A/150
SULFURIC ACID (CONCENTRATED TO 98%)	B	D	D	D	C	A	A	C	D	D	B	—	A/150	D	D	C/72	B/70	A/120
SULFURIC ACID (20% OLEUM)	D	D	D	D	D	B	A	—	D	D	—	—	—	D	D	D	—	—
SULFUROUS ACID	A	D	B	C	—	A	A	B	D	D	B	B	A/250	D	D	A	B/120	A
SYRUP	A	—	B	A	—	A	—	A	A	—	A	—	—	—	A	A	—	—
TALLOW	B	A	—	A	A	A	A	A	A	—	A	—	—	A/70	A	B/70	C	—
TANNIC ACID	A	A	B	A	C	A	A	A	C	C	A	B	A/250	C	B	A	A	A
TANNING LIQUORS	A	—	—	C	—	A	A	—	C	—	A	A	A/250	A/70	B	A	A/70	—
TAR, BITUMINOUS	B	—	C	B	D	A	A	—	—	B	B	—	A	B	B	—	—	—
TARTARIC ACID	A	A	B	A	B	A	A	C	C	C	A	B	A/250	B/70	B	A	A/70	A
TERPINEOL	B	B	D	C	B	A	A	—	A	A	A	—	—	—	—	D	—	B/120
TERTIARY BUTYL ALCOHOL	B	D	A	A	A	B	A	—	—	—	—	—	—	—	A	B	—	—
TERTIARY BUTYL CATECHOL	B	D	B	D	B	A	A	—	C	B	B	—	—	—	A	—	—	—
TERTIARY BUTYL MERCAPTAN	B	D	D	D	D	A	A	—	—	—	—	—	—	—	B	—	—	—
TETRA BROMOMETHANE	D	—	D	D	D	A	A	—	D	—	—	—	—	—	—	D	—	—
TETRABUTYL TITANATE	B	—	A	B	B	A	A	—	—	—	—	—	—	—	—	—	—	—
TETRACHLOROETHYLENE	D	B	D	D	D	A	A	—	D	A	A	—	A/200	A/70	A	D	B	—
TETRACHLOROETHANE	D	—	—	D	D	A	A	—	D	A	A	—	—	C	A	D	—	—
TETRAETHYL LEAD	C	—	D	B	D	A	A	—	—	—	—	—	—	—	—	A/70	—	A
TETRAHYDROFURAN	B	C	D	D	C	B	A	B	—	—	A	A	D	A	C	C	C/70	B/70
TETRALIN	C	—	D	D	D	A	A	—	A	A	A	—	—	—	—	D	—	—
THIONYL CHLORIDE	B	—	D	D	D	A	A	—	D	D	—	—	A/150	C	—	D	—	D
TITANIUM TETRACHLORIDE	D	D	D	C	D	A	A	—	D	A	B	—	—	A/70	—	D	—	A
TOLUENE	C	C	D	C	D	A	A	B	A	A	A	A	A/200	A/70	A	D	C/70	A
TOLUENE DIISOCYANATE	B	—	D	—	A	—	A	—	—	—	—	—	—	—	C	—	—	—
TOLUENE, TOLUOL	C	C	D	D	D	A	A	B	A	A	A	—	A/150	A/70	A	B/175	C/70	A
TOMATO JUICE	A	—	A	A	—	—	A	A	A	—	A	—	A/250	A	A	A	A/70	A
TRANSFORMER OIL	D	D	C	B	D	A	A	—	A	A	A	—	A/250	A/70	A	B/70	—	—
TRANSMISSION FLUID TYPE A	C	A	C	A	D	A	A	—	A	A	A	—	—	—	A	—	—	—
TRIACETIN	A	D	A	A	A	C	A	—	B	—	—	—	—	—	—	—	—	—
TRIBUTOXY ETHYL PHOSPHATE	B	D	D	D	A	B	A	—	—	—	—	—	—	—	—	—	—	—
TRIBUTYL PHOSPHATE	B	D	D	D	C	D	A	—	—	A	—	—	A/73	—	—	A/70	—	A/70
TRIBUTYL MERCAPTAN	B	—	D	D	D	A	A	—	—	—	—	—	—	—	—	—	—	—

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E4 1/03
REPLACES E4 9/01

CHEMICALS	ELASTOMERS								METALS					PLASTICS				
WILDEN A DOVER COMPANY 22069 Van Buren Street Grand Terrace, California 92313-5607 Telephone (909) 422-1730 • FAX (909) 783-3440 www.wildenpump.com	WIL-FLEX™	POLYURETHANE	NEOPRENE	BUNA-N	NORDEL	VITON®	TEFLON®	SANIFLEX™ TPE	ALUMINUM	CAST IRON	STAINLESS STEEL (316)	HASTELLOY®	HALAR® ECTFE COATED	NYLON	CARBON-FILLED ACETAL (CFA)	POLYPROPYLENE	POLYETHYLENE	PVDF
TRICHLOROACETIC ACID	B	D	B	C	B	B	A	—	D	D	D	B	A/150	D	D	B/70	A	A/70
TRICHLORETHANE	D	D	D	D	D	A	A	—	D	B	A	A	—	C	A	D	—	A/120
TRICHLORETHYLENE	D	D	D	D	D	A	A	D	D	C	A	A	A	A/70	A	B/72	D	A
TRICHLOROPROPANE	D	—	A	A	—	A	A	—	D	A	A	A	—	—	A	D	—	—
TRICRESYLPHOSPHATE	B	C	D	D	A	B	A	—	D	B	A	A	—	A/120	C	B/70	B/70	—
TRIETHYLAMINE	B	—	B	A	—	A	A	—	—	A	—	—	A/150	A/70	A	C	—	A/120
TRIETHANOL AMINE	A	D	B	B	B	B	A	D	B	A	A	—	A/73	A/70	A	A/70	—	A/70
TRIETHYL ALUMINUM	B	—	D	D	—	B	A	—	—	—	—	—	—	—	—	—	—	—
TRIETHYL BORANE	B	—	D	D	—	A	A	—	—	—	—	—	—	—	—	—	—	—
TRINITROTOLUENE	A	—	A	D	D	C	A	—	—	—	—	—	—	—	—	—	—	—
TRIOCTYL PHOSPHATE	B	—	D	D	A	B	A	—	—	—	—	—	—	—	—	—	—	—
TRIARYL PHOSPHATE	B	B	C	D	A	A	A	—	—	—	—	—	—	—	—	—	—	—
TUNG OIL	B	B	B	A	C	B	A	C	A	B	B	—	—	—	—	—	—	—
TURPENTINE	C	D	D	A	D	A	A	—	A	B	A	B	A/200	A/70	A	B/175	D	A
UNLEADED GASOLINE	C	D	D	D	D	A	A	—	A	A	A	A	—	A	A	D	—	C
UNSYMMETRICAL DIMETHYL HYDRAZINE (UDMH)	B	—	B	C	A	D	A	—	B	A	A	—	—	—	—	—	—	A/70
URINE	A	—	D	A	—	A	—	—	B	B	A	—	—	A/70	A	A	A/70	A
VEGETABLE JUICE	A	A	D	A	A	A	A	—	A	D	A	—	—	A	A	—	—	—
VEGETABLE OILS	B	A	B	A	A	A	A	—	A	B	A	—	—	—	A	A/120	—	A
VERSILUBE F44 & F50D	D	—	C	A	A	A	A	—	—	—	—	—	—	—	—	—	—	—
VINEGAR	A	B	B	C	A	A	A	—	D	C	A	A	A/200	C	A	A	A	A
VARNISH	B	C	D	B	D	A	A	—	A	C	A	A	—	C	A	A	A	—
VINYL CHLORIDE	D	—	D	D	C	A	A	—	D	B	—	A	—	A/70	—	D	—	A
WAGNER 21 B FLUID	C	—	A	C	A	D	A	—	—	—	—	—	—	—	A	—	—	—
WATER, ACID, MINE	A	A	B	A	A	A	A	—	D	D	A	—	A/250	B	A	A	A/120	A
WATER, DISTILLED, LAB GRADE 7	A	A	B	A	A	A	A	—	B	D	A	—	A/250	A/70	A	A	A/120	A
WATER, FRESH	A	A	B	A	A	A	A	—	A	B	A	A	A/250	A/70	A	A	A/120	A
WATER, SALT	A	A	B	A	A	A	A	—	D	D	C	A	A/250	A/120	A	A	A/120	A
WEED KILLERS	B	—	C	B	—	A	—	—	D	—	A	—	—	A	A	—	—	—
WHEY	A	—	—	A	—	A	—	—	B	—	A	—	—	—	A	—	—	—
WHISKEY AND WINES	A	D	A	A	A	A	A	—	D	D	A	—	A/200	A/70	A	A	C	A
WHITE LIQUOR (PULP MILL)	A	—	A	A	A	A	A	—	B	C	A	A	A/200	A/70	A	A	A/120	A
WHITE PINE OIL	C	—	D	B	D	A	A	—	—	—	—	—	—	—	A	—	—	—
WHITE OIL	C	—	B	A	D	A	A	—	—	—	—	—	—	—	A	—	—	—
WHITE WATER (PAPER MILL)	A	—	A	—	—	A	—	—	—	A	A	—	—	A	A	A	—	—
WOOD OIL	B	B	B	A	C	B	A	—	A	A	A	—	—	—	—	—	—	—
XYLENE	C	D	D	D	D	A	A	B	A	A	A	A	A/200	A/120	A	B/72	B	A
XYLIDENES	C	D	D	D	—	C	A	—	—	—	—	—	—	—	—	—	—	—
ZEOLITES	A	—	C	C	A	A	A	—	—	—	—	—	—	—	—	—	—	—
ZINC ACETATE	A	D	C	C	A	C	A	—	—	—	A	—	—	—	—	—	—	—
ZINC CHLORIDE	A	A	A	A	A	A	A	A	D	D	C	C	A	C	D	A	A/70	A
ZINC HYDROSULPHITE	A	—	A	A	—	—	—	—	D	D	A	—	—	—	C	—	—	A
ZINC SULFATE	A	—	A	A	A	A	A	—	D	D	A	A	A	C	C	A	A/120	A

Ratings: A: Minor effect; B: Minor to moderate effect; C: Moderate to severe effect; D: Not recommended; —: Insufficient information.

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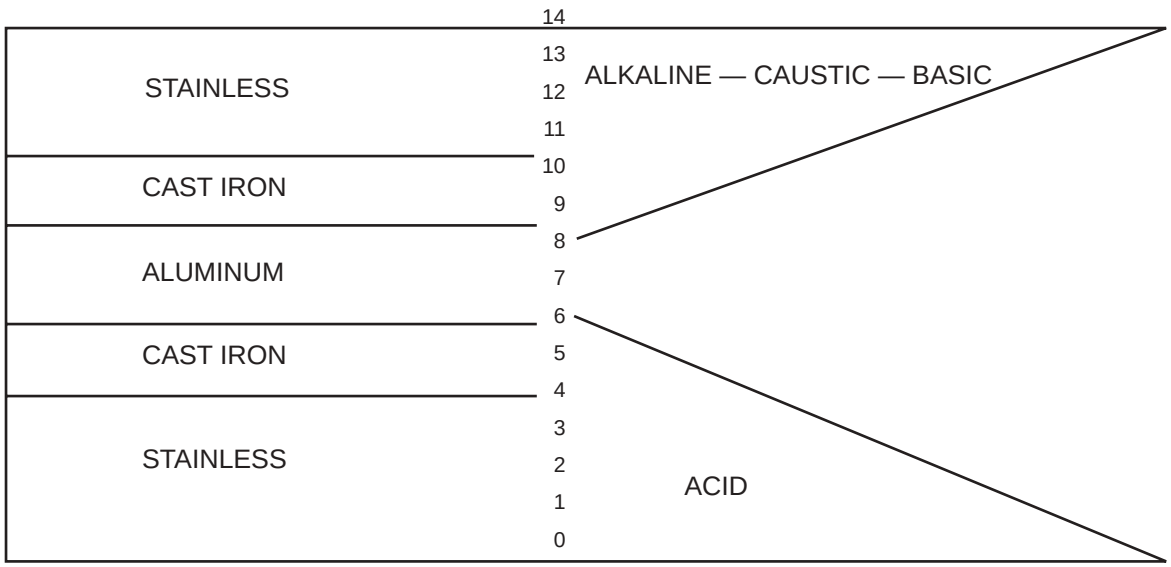
HALOGENATED SOLVENTS WARNING

Halogenated solvents can, under certain circumstances, corrode aluminum or galvanized parts. If the wetted parts or a pressurizable fluid system contain aluminum or galvanized parts, this corrosive action could cause an EXPLOSION. Although manufacturers of these solvents typically add inhibitors, there is no known inhibitor that will prevent the corrosive reaction under ALL circumstances. Special caution should be exercised handling reclaimed or used solvents since the inhibitors are often degraded. ONLY stainless steel or PVDF pumps should be used for these materials. Typical examples of halogenated hydrocarbon solvents (H.H.C.) include, but are not limited to, the following: Trichlorethane, Trichlorethylene, Methylene Chloride, Methyl Chloride, Carbon Tetrachloride, Chloroform, Dichlorethylene.

- **Determine the pH value:**
- pH is a measure of hydrogen-ion concentration. pH of 7 is neutral — below 7, acid — above 7, alkaline.



ELASTOMER SELECTION GUIDE FOR SOLVENTS

The liquids classified and listed below usually **cannot** be handled with Neoprene or Buna-N and will probably require Wil-Flex™, Viton®, Nordel and/or Teflon®.

a. **Ketones and Aldehydes**
1. Methyl ethyl ketone
2. Methylacetone
3. Acetone
4. Formaldehyde

→ Wil-Flex™ Nordel/Teflon®

b. **Acetates**
1. Ethyl acetate
2. Isopropyl acetate
3. Amyl acetate
4. Butyl acetate

→ Wil-Flex™ Nordel/Teflon®

c. **Aromatic Hydrocarbons**
1. Benzene
2. Toluol (toluene)
3. Xylene (xyol)
4. Benzol
5. Hexane
6. Cyclohexane
7. Napthalene

→ Viton®/Teflon®

d. **Chlorinated Hydrocarbons**
1. Carbon tetrachloride
2. Trichlorethylene
3. Ethylene dichloride
4. Methyl chloride
5. Propyl chloride
6. Chloroform
7. Dichlorethylene

→ Viton®/Teflon®

TEMPERATURE LIMITS FOR ELASTOMERS

Wil-Flex™	–40 °	to 107.2° C	(–40°) to (+225°) F
Neoprene	–17.8°	to 93.3° C	(0°) to (+200°) F
Buna-N	–12.2°	to 82.2° C	(+10°) to (+180°) F
Nordel	–51.1°	to 137.8° C	(–60°) to (+280°) F
Viton®	–40 °	to 176.7° C	(–40°) to (+350°) F
Teflon® PTFE[1]	4.4°	to 104.4° C	(+40°) to (+220°) F
Polyurethane	–12.2°	to 65.6° C	(+10°) to (+150°) F
Saniflex™ TPE	–28.9°	to 104.4° C	(–20°) to (+220°) F

TEMPERATURE LIMITS FOR PLASTICS

Polypropylene	0°	to 79.4° C	(+32°) to (+175°) F
Polyethylene	0°	to 70.0° C	(+32°) to (+158°) F
PVDF	–12.2°	to 107.2° C	(+10°) to (+225°) F
Teflon® PFA[2]	–28.9°	to 107.2° C	(–20°) to (+225°) F
Acetal	–28.9°	to 82.2° C	(–20°) to (+180°) F
Nylon	–17.8°	to 93.3° C	(0°) to (+200°) F

4.4° to 148.9°C Model T1, A1 & T2, A2 only. [1] (+40° to +300°F)
-28.9° to 148.9°C Model T1 & A1 only. [2] (–20° to +300°F)

NOTE: These are average temperatures. Chemicals and solvents can have an effect on temperature limits.

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RUBBER COMPOUNDS

Listed below are the various rubber compounds manufactured for use as elastomers in Wilden pumps. These compounds consist of natural rubber and man-made additives to increase the compounds' resistance to specific types of fluids. Diaphragms made of these compounds will utilize a nylon fabric mesh. The mesh is centered within the diaphragm during the molding process. The fabric mesh lends dimensional stability and strength to the compound. The elastomers manufactured of these compounds are fabricated using compression molding process.

COMPOUND	COLOR CODE	MOLD STAMP	TEMPERATURE LIMITS	SUITABLE APPLICATIONS
Neoprene	Green	NE	–17.8° to 93.3° C 0° to +200° F	An excellent general purpose diaphragm for use in non-aggressive applications such as water-based slurries, well water or sea water. Exhibits excellent flex life and low cost.
Buna-N	Red	BN	–12.2° to 82.2° C +10° to +180° F	Excellent for applications involving petroleum/oil-based fluids such as leaded gasolines, fuel oils, non-synthetic hydraulic oils, kerosene, turpentines and motor oils.
Nordel	Blue	ND	–51.1° to 137.8° C –60° to +280° F	Excellent for use in applications requiring extremely cold temperatures. May also be used as a low cost alternative when pumping dilute acids or caustics.
Viton®	Silver	VT	–40° to 176.7° C –40° to +350° F	Excellent for use in applications requiring extremely hot temperatures. May also be used with aggressive fluids such as aromatic or chlorinated hydrocarbons and highly aggressive acids. Teflon® would normally be used with these aggressive fluids as its flex life is better than Viton®. However, in applications involving suction lift outside the range of Teflon®, Viton® will be the preferred choice for highly aggressive fluids.

THERMOPLASTIC COMPOUNDS

Listed below are the various thermoplastic (TPE) compounds manufactured for use as elastomers in Wilden pumps. These compounds are comprised entirely of man-made elements. Thermoplastic elastomers manufactured of these compounds are fabricated using an injection molding process. Diaphragms made of these compounds require no fabric reinforcement due to the dimensional stability and tensile strength inherent in TPE compounds.

COMPOUND	COLOR CODE	TEMPERATURE LIMITS	SUITABLE APPLICATIONS
Polyurethane	Clear	–12.2° to 65.6° C +10° to +150° F	An excellent general purpose diaphragm for use in non-aggressive applications. This material exhibits exceptional flex life and durability. Wilden's least expensive diaphragm.
Wil-Flex™	Orange	–40° to 107.2° C –40° to +225° F	Excellent choice as a low cost alternative to Teflon® in many acidic and caustic applications such as sodium hydroxide, sulfuric or hydrochloric acids. Exhibits excellent abrasion resistance and durability at a cost comparable to neoprene.
Saniflex™	Cream	–28.9° to 104.4° C –20° to +220° F	Exhibits excellent abrasion resistance, flex life and durability. This material is FDA approved for food processing applications. An outstanding general purpose diaphragm as well.

TEFLON® COMPOUNDS

Teflon® PTFE is one of the most chemically inert man-made compounds known. Wilden engineers were the first to discover that by reinforcing a molded Teflon® PTFE diaphragm with concentric ribs they could control the flex pattern of the diaphragm. The ribbed design extended flex life 5 to 10 times longer than that of any other Teflon® diaphragm. This innovation made the use of Teflon® elastomers in diaphragm pumps cost effective, greatly expanding the range of applications for diaphragm pumps. Teflon® is not an elastic material; therefore, Teflon® diaphragms require a rubber back-up diaphragm to provide flexibility and memory. Also, when using a Teflon® diaphragm, flow rates will be reduced by up to 20%. This is due to the inability of Teflon® to flex as far as a rubber diaphragm which will decrease displacement per stroke.

COMPOUND	COLOR CODE	TEMPERATURE LIMITS	SUITABLE APPLICATIONS
Teflon® PTFE	White	4.4° to 104.4° C +40° to +220° F	Excellent choice when pumping highly aggressive fluids such as aromatic or chlorinated hydrocarbons, acids, caustics, ketones and acetates. Exhibits good flex life compared to a standard rubber diaphragm.

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